4.5

The Musical Language
A comparative approach

MARKOS SKOULIOS

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The aim of this chapter is to make a structural comparison of the contemporary modal and notational systems of two art traditions, Ottoman-Turkish classical music and Byzantine chant (*psaltiki*), which developed in the same geographical region for several centuries. The exceptional interest this juxtaposition presents is that although the aforementioned systems have today the common task of explicating and transcribing very similar melodic material[1], having descended from different ancestors, they vary in matters of structure and conceptualization. The present attempt to elucidate the perspectives of these twin theoretical systems will take into account the fact that Turkish theory is much more familiar to prospective readers.

The modal systems

We can conceptualize a modal system as a categorization of the melodic types existing in a musical tradition according to several melodic rules and characteristics, in such a way as to end up with a system of modes reasonably distinct from each other and covering the largest part of the melodic material. Examining the *Octoechos* complex we can easily see that this modal organization does not exactly fit this definition as considerably different melodic types are grouped under the same *echos* name (as with the case of the *Varys* or 4th *echoi*) while on the other hand very similar modal types belong to different groups (3rd *echos* and *Varys* on *Γα*). This being a strictly religious and therefore conservative tradition with an emphasis on the text, a modal categorization has developed based on idiosyncratic organizational principles that have retained throughout history the basic framework of the eight *echoi*, whose number refers to liturgical and cosmological symbolism (Alygizakis 1985: 171-182). Nevertheless, theoretical treatises from as far back as the early Byzantine period abound in references to the subcategories of the *echoi*, distinguishing branches such as *mesos, paramesos, difonos* etc. (see Vol History, Apostolopoulos ch. 2.1.1). This old analytical and composite modal organization reintroduced by Karas in the modern period is representative of the ancient tradition of hierarchical and symmetrical modal systems which were closed-ended for the groups of primary modal entities and open-ended for the derivative ones - to some extent the contemporary *Dastgâh* system of Persian classical music belongs to this category as well. This system, apart from being much more compatible with the above-mentioned general definition of a modal system, has a great pedagogical value as it shows the inherent relation of the primary modes with the fundamental scale and the generative mechanisms that produce derivative modal entities. Furthermore, the descriptive terminology deriving from this analytical model offers an alternative to the "nominal" method of the *makam* system, having the advantage of containing considerable information about the mode's melodic characteristics. This is evident in the analyses of *makam*s by Rum theoreticians – such as Chalatzoglou, Kyrillos, Stefanos or Kiltzanides - where the corresponding names in Byzantine terminology are lengthier, containing valuable musicological information. This information helps the categorization of *makam*s in a way that relates them to the actual grouping of the modes in musical practice according to their finalis, lower tetrachord, dominant degree and descending or ascending direction, similar to the *fasilah* grouping in Arabic theory (Marcus 1989:842-4). This periphrastic description is, though, of limited use, failing as it does to denominate all the cases of a modal system with many entities such as that of Ottoman-Turkish *makam*s. As an example, names like plagal 4th *diphonos* (for *Sazkâr*) or plagal 1st *diphonos* (*Sabâ*) or *mesos* of 2nd *echos* (*Hüzzam*) are highly indicative of these modes' subordinance to the primary modal entities they derive from, as well as their semantic differential from them, but the characterization as *plagal* 4th *chromatic* of both *makam*s *Neveser* and *Nikriz* fails to distinguish their significant difference. This is the main reason why many theoreticians and practitioners of Byzantine *chant* introduced *makam* names to discriminate between modal subcategories or modulations of the main modal entities (this in addition to the possibility that some of the modulations were initially inspired by these *makam*s). On the other hand the modern Turkish system seems to have abandoned the old-fashioned hierarchy of the modal entities and gained a considerable number of new modes, which along with many old ones fight for a place in the repertoire on the basis of 'equal opportunity'.

Juxtaposing the structural elements of the two systems

The exceptional importance of the fundamental scale in the history of both systems is perhaps a key point in this comparison. In Greek-Byzantine theory this mild diatonic configuration, derived by the conjunction of two identical pentachords, is conceived as the mother scale of the whole system, producing all primary modes independently of their genus. The numerical arrangement of the *baseis* of all the primary modal entities of the *Octaechia* along the degrees of this scale is still apparent despite the relocations of the reform of 1814. Although the foundation of the Ottoman-Turkish modal organization was based on an analogous hierarchical relation of the basic *makam*s and the position of their finalis on the fundamental scale (Feldman 1996: 195-218), in the modern theoretical model this is not so conspicuous. Moreover, the use of this scale as the reference point in the notational system by Yekta (Feldman 1996: 205) was abolished by the establishment of the *do* major scale in its place, which further distanced the former from its old prominent position.

An important feature that brings Ottoman-Turkish and Greek-Byzantine traditions close to each other is the intonation of certain degrees responsible for particular melodic nuances. Both theoreticians and practitioners agree that the intervals heard in present day Byzantine *chant* and Ottoman-Turkish classical music are in most cases identical while being considerably different from the corresponding Arabic. Starting from the above-mentioned fundamental scale we first have to focus on the intonation of the sensitive degrees *Βου* (*Segâh perde*), *Ζω* (*Eviç*) and *ζω* (*Irak*). The treatment of these degrees is so distinctive that it allows one to immediately distinguish between the Turkish and Arabic versions of primary *makam*s such as *'Uşşâk-Bayâti, Rast* or *Segâh*. Both theory and practice agree that despite regional diversities the Arabic aesthetics on the intonation of these degrees prefers the Zalzalian geometric mean - either tempered (in the system of 24 quartertones) or not - forming two neutral tones either way, which according to measurements seems to be true for the Iranian neutral *koron* intervals as well (Feldman 1996: 209-210; Farhat 1990: 15-18). Although for Byzantine *chant* and Ottoman-Turkish classical music these positions are considered very low for the "nominal" intonation of these degrees, they are widely used in these traditions as well, being their lowered versions (Signell 1977: 158). It is most probable that the long engagement of Rum chanters and theoreticians with Ottoman classical music is responsible for the introduction of these lowered Arabo-Persian degrees in Byzantine *chant* - both Chrysanthos and Stefanides mention these geometric means among other intervals which the latter author calls "Asian", attributing their existence to the tanbur (Apostolopoulos Vol I. Ch.). However Greek-Byzantine tradition seems to have always preferred higher positions for these degrees of the mild diatonic genus, close to the ones given by Zarlino (see chapter 4.3). All these facts suggest an interesting possibility concerning the origin of the phenomenon of the alternative use of high and low versions of these degrees in modern Turkish and Greek musical practice. It is possible that the phenomenon described in Greek literature as "melodic attractions" is in this case the combination of the Arabo-Persian preference of lower positions with the Greek-Byzantine of the higher ones - see also Feldman's discussion of the old and new intonation of *Segâh perde* (1990: 206-213). Analogous phenomena can be observed in the intonation of the intermediary degrees of the chromatic tetrachord used in the *makam*s *Hüzzam, Karçiğar, Suzinâk* etc.- which Byzantine theory explains as "mild" - or the fourth degree of the *makam Sabâ*.

Notwithstanding the practically identical intervallic choices for the equivalent modes existing in the two traditions, the explanatory perspectives of modern period Greek and Turkish theoreticians seem to diverge. One of the main concerns of Greek scholarship has been (and still is) to propose euphonic combinations of *epimoric*[2] or small number ratios for the amazing variety of intervals the phenomena of *genera* and "melodic attractions" imply. By contrast, the philosophy of the modern Turkish system – after Yekta's reintroduction of intervallic theory, possibly under the influence of his contact with Byzantine theory mentioned above - is not to dwell on the subject but rather propose a simple and consistent Pythagorean model of intervals. A reason for this might be the important role fretted instruments have always played in the formation of Ottoman-Turkish theory by establishing a (non-equal) tempered general scale allowing only a certain number of possible notes. By contrast, in the case of Byzantine music the "fretless" human voice imposed no such restrictions. As a result the Turkish model proposes a simple and rigid mathematical consistency applicable to the fretting of instruments while the Greek-Byzantine one suggests a flexible consistency suitable to the intonational fluidity of the interpretations of the human voice and non-fretted instruments. However, the simplified Pythagorean model of two notes for each degree suggested by the Ezgi-Arel system - one low and one high (Signell 1977: 26-30) - does not seem to be adequate for these music idioms because of the crucial role the various "neutral" tones play in them. Furthermore, the insistence on the Pythagorean model ends up with intervals such as 65536/59049 (minor tone) of 6578439/42376456 (comma), which, being a product of such high harmonics, are not likely to be realized in practice while their *epimoric* equivalents have a difference smaller than 2 cents. Nevertheless, until scientifically confirmed, the only thing this abundance of possible natural intervals proves (see catalog in table 1) is the range of potential choices for a practitioner of these idioms to express himself through minute variations in intonation.

Table 1 contains the mathematically exact values of the most commonly suggested natural intervals in the form of frequency ratios x/y as well as their truncated arithmetic equivalents in three different systems. The latter are calculated by means of the transformation formula A*log(x/y)/log2 giving each interval in the form of a number that indicates its size in terms of a measurement unit (which divides the octave in A equal parts). The usefulness of these arithmetic systems should be judged on the basis of their effectiveness in describing all the basic intervals used in a system by means of an elegant set of small but reasonably accurate numbers. A careful comparison of the two systems in table 1 shows that the Merkatoric system used in Turkish theory is much more elegant and efficient than the Byzantine one since the approximate values ascribed to most basic intervals such as 256/243 (4 commas), 16/15 or 2187/2048 (5 commas), 10/9 or 65536/59049 (8), 9/8(9),

SOME COMMONLY SUGESTED 'NATURAL' INTERVALS

	Geometric Method	Arithmetic Methods		
	Frequency Ratios	Merkatoric commas	Byzantine tmimata	cents
Octave	2/1.	53	72	1200
Fifth	3/2.	31	42.18	702
Fourth	4/3.	22	29.88	498
Major third (Ditone)	81/64.	18.01	24.47	408
Just (mild) diatonic major third	5/4.	17.06	23.17	386
Zalzalian mean	27/22	15.66	21.27	355
Just diatonic minor third	6/5.	13.94	18.94	316
Pythagorean minor third	32/27	12.99	17.65	294
Enharmonic minor third	7/6.	11.79	16.01	267
'Hypermajor' tone	8/7.	10.21	13.87	231
Major tone	9/8.	9.01	12.23	204
Minor tones	10/9.	8.06	10.94	182
	65536/59049	7.97	10.83	180
'Neutral' tones	54/49	7.43	10.09	168
	11/10.	7.29	9.9	165
	800/729	7.11	9.65	161
	12/11.	6.65	9.04	151
	13/12.	6.12	8.31	139
	27/25	5.88	7.99	133
'Least' tones	14/13	5.67	7.7	128
	15/14	5.27	7.17	119
Apotome	2187/2048	5.02	6.82	114
Major semitone	16/15	4.93	6.7	112
Pythagorean *Lemma*	256/243	3.98	5.41	90
Enharmonic semitones	25/24	3.12	4.24	71
	28/27	2.78	3.78	63
Didymian *comma*	81/80	0.95	1.29	22

Table 1

32/27(13), 5/4(17), 81/64(18), 4/3(22), 3/2(31) are extremely close to the exact ones.

Even though tetrachordal analysis is widely used in contemporary Byzantine theory, the role of tetrachords and pentachords is slightly different from the one they play in modern Turkish (as well as Arabic) theory where they are treated as independent subunits used directly to construct larger structures. In the former theory the boundaries of a tetrachord or a pentachord are always a perfect fourth and fifth (respectively) apart, a perspective reflecting the ancient idea of a subunit having two stable extremes in consonance, the notes in between being variable. Therefore the instances of incomplete subunits used in Turkish theory such as the *Sabah* tetrachord or *Eksik Segâh* or *Eksik Müstear* pentachords would not be accepted in the Greek –Byzantine system since, their boundaries forming an unstable interval, they cannot function in the repetitive manner of the *systemata* method to create scales. In the same manner pentachords with a diminished or augmented 4th degree such as *Hüzzam, Nikriz, Pençgâh* or *Ferâhnak* are not acceptable since a pentachord in this system is always composed of a complete tetrachord and a major tone. The instances where these subunits are employed in Turkish music are interpreted by Byzantine theory as polarizations of a scale by means of *fthores* or *chroes* or as melodic attractions. For example *Segâh* and *Hüzzam* are seen as using the "mild" diatonic and "mild" chromatic scales respectively having as tonal center *Δι* (*Nevâ perde*) and cadencing on the "middle" degree Βου (*Segâh perde*). An interesting case is that of *Sabâ makam*, which is seen as 1st *Echos difonos,* i.e. as an '*Uşşak* cadencing on *Çargâh perde* which being the dominant degree attracts the fourth degree from *Nevâ* to *Sabâ perde*.

The Arabic word *cins* used for the notion of tetrachord, obviously deriving from the Greek word *genus* (Marcus 1989: 275), implies the underlying importance of the concept even if it is not explicitly referred to. Applying the *genus* distinction to the main Turkish tetrachords we could say that '*Uşşak* and *Rast* belong to the "mild" diatonic, *Çargâh*, *Bûselik* and *Kurdi* to the "tense'" diatonic while *Hicaz* to the "tense" chromati*c*. The absence of "mild" chromatic *genus* is only ostensible since practitioners refer extensively to the "softer" intervals used by the erroneously named *Hicaz* tetrachords in *makam*s like *Suzinâk*, *Karçiğar* or *Sabâ*[3].

The prominent position of the drone not only in ecclesiastical but also in all other aspects of contemporary musical practice in Greece has a parallel only in Indian music. Even though there is no special role for a voice or an instrument keeping the drone in Turkish music, we often hear a drone reference on the back of a *taksim* or a *gazel* performance. Again, the phenomenon of melodic attractions is not explicitly referred to by Turkish theory but the alteration of the intonation of certain degrees depending on the direction of the melody is undoubtedly among the fundamental characteristics of this tradition. Some of these alterations are even denoted in scores (as with the alternative use of *Eviç* and *Acem perde*s in many *makam*s), but highly educated performers speak of many more cases, the majority of which are identical with the equivalent in Byzantine *chant*.

A juxtaposition of specific modal characteristics of the two systems shows a great structural affinity. Both schemes are based on a hierarchy of the degrees starting with the finalis (*karar-basis*) - though in the Byzantine model there are extraordinary instances in which the finalis and the *basis* (main drone reference) do not coincide - and continuing with the notions of *güclü* (*despozousa*), *muvakkat kalışlar (enteleis katalixeis)* and *asma karar (ateleis katalixeis).* The concepts of "opening degree" (*Giriş*) and "melodic direction" do not exist in Byzantine theory but the modal categorization they imply corresponds to the division of a primary *echos* into its derivatives *mesos*, *paramesos*, *diphonos*, *triphonos, tetraphonos,* *etc*. The “characteristic motives” and “stereotyped melodies” of a *makam* are directly equivalent to the characteristic *theseis* of the *Octaechia* model while the idea of an appropriate ambitus for each modal entity is present in both systems. The important concept of *seyir* is also absent from the Byzantine model though the above-mentioned subcategories imply a roughly predetermined path of melodic unfolding. The essential role of modulation in both traditions is unquestionable though a point where the explanatory approaches of the two systems differ considerably. Beginning with the denotation of modulation it is possible to observe

A list of some basic makams and their explanation in terms of byzantine modal theory	
Makam	Corresponding Echos
Rast	Plagal of 4th
Mahur	Plagal of 4th heptafonos
Nihavend	Plagal of 4th tetrafonos tense diatonic with low βου or Plagal of 1st tense diatonic with high βου transposed on νη
Suzinâk	Plagal of 4th tetrafonos combined with 2nd echos
Pençgâh	Plagal of 4th tetrafonos combined with chroa Kliton
Hicazkâr	Plagal of 4th heptafonos tense chromatic or plagal of 2nd heptafonos tense chromatic transposed on νη
Kurdili-Hicazkâr	Plagal of 1st heptafonos tense diatonic with low βου transposed on νη
Nikriz	Plagal of 4th tetrafonos tense chromatic
Uşşak	1st echos
Beyâti	1st echos trifonos or sticherarikos
Isfahân	1st echos trifonos combined with chroa Kliton
Hüseynî	Plagal of 1st
Sabâ	Plagal of 1st difonos or ‘Naos’
Hisar	Plagal of 1st with chroa Spathi
Acem	Plagal of 1st pentafonos
Muhayyer	Plagal of 1st heptafonos
Kürdi	Plagal of 1st tense diatonic with low βου
Bûselik	Plagal of 1st tense diatonic with high βου
Karçiğar	2nd paramesazon or ‘defteroprotos’ or 2nd combined with plagal of 1st
Hüzzam	Mesos of 2nd
Nevâ	4th echos paramesazon
Nişâbûr	Chroa Kliton with finalis on high βου
Segâh	Mesos of 4th echos or ‘Leyetos’
Müstear	Mesos of 4th with chroa Zygos
Irak	Mesos of 1st or ‘Protovarys’
Eviç	Varys mild diatonic heptafonos
Evçara	Varys tense chromatic heptafonos
Bestenigâr	Varys mild diatonic tetrafonos
Acem Aşiran	Varys tense diatonic (usually called ‘Enharmonic’) heptafonos
Hicaz	Plagal of 2nd
Hümâyûn	Plagal of 2nd tetrafonos or 4th tense chromatic paramesazon
Şehnâz	Plagal of 2nd heptafonos
Çargâh	3rd echos in most cases fthorikos (using lowered δι)

Table 2

that Turkish theory restricts itself to the introduction of the necessary alterations of the specific degrees. On the other hand, in the Byzantine system a single *fthora* or *chroa* implies a series of modifications involving changes of *genus*, *systema*, melodic attractions or position of the specific degree on which the sign appears in the general scale. Due to the prominent position of the text in the latter tradition, modulations that would not be acceptable in the Turkish system are part of the standard repertoire, used to underline certain meanings of the content. However, the highly analytical Turkish *makam* system provides the opportunity to codify with a distinct name each tiny modal change (for an explanation of some basic *makam*s in terms of Byzantine modal theory, see table 2). Moreover, the concept of composite *makam*s (*mürekkeb*) described by complicated *seyir*s, nonexistent in Byzantine theory, offers the opportunity of endlessly expanding the system with compound modal constructions, leaving room for creativity and evolution.

The Notational Systems

The evolution of the notational system of Byzantine music in the modern period followed a unique path resulting in a form highly distinct from its Near and Middle Eastern equivalents. *Parasimantiki* illustrates the unfolding of the single melodic line by means of quantitative and qualitative information on its behaviour in relation to a reference *basis* degree, assuming the knowledge of all the modal characteristics of the specific *echos* declared at the beginning of the score. With the *arktiki martyria* both the starting degree and the modal framework are specified and from then on a large set of signs are employed to describe every step of the melody in full detail. Even though the Patriarchical Committee suggested the fixation of the degree *νη* at the frequency of the European *do* (256Hz), the absolute intonation of the degrees has always been a flexible factor left to the choice of the performer. By contrast, one aspect of significant importance is the relative position of the degrees of a chant with regard to the fundamental scale. In that sense it resembles the Eastern systems where even though Western staff notation has been adopted, the actual pitch of the performance does not necessarily coincide with that of the score. The adoption of Western staff notation in the East provided the advantages of a widely spread simple and functional system, which, however, has a very different philosophy depicting absolute pitches independent from one another in a way that no tonic or melodic rules are obvious or presupposed. In the case of the Turkish system (analogous factors hold for the other Middle Eastern systems) this deficiency is surmounted by specifying the *makam* along with the necessary alterations - by means of special signs - from the reference scale (*do* major) in the key signature, while the absolute intonation of the performance is specified by means of the so-called tuning systems (*Bolahenk*, *Mansur*, etc.). The old system of *perde*-names raises to prominence the microtonal structure of the general scale of the Ottoman model. Nevertheless, the seven degrees terminology such as the Byzantine *νη, Πα, Βου*, or the Latin *sol*, *la*, *si*. used in the modern Turkish solfège, are more convenient, taking into account as they do the flexibility of pitch distinctive to most degrees present (melodic attractions).

A very important characteristic of both Byzantine and Ottoman-Turkish notational systems throughout their history has been the fact that each assumed a high level of proficiency by the prospective reader and for that reason they did not contain much of the information needed to perform these scores. Even though these systems have become more accurate and analytical, this fact still holds true due mainly to the exceptional elaboration of the single melodic line in these traditions, consisting of details in intonation, rhythm, ornamentation, phrase analysis and style. This high elaboration restrains the role of notation to that of a mnemonic code and is the reason why these traditions rely mostly on oral transmission. We can think of a continuum existing between completely oral transmission, the old type of stenographic depiction and the more analytical notational systems used today[4], depending on the amount of memorization each method involves. Even the current versions of scores in both traditions demands a long training of the prospective interpreter in order for him to become capable of transforming this mnemonic code into actual music. Nevertheless, modern Byzantine notation is definitely more analytical, capable of depicting subtle nuances in ornamentation and style, something that makes it more efficient than the contemporary Turkish system for transcribing slow melismatic compositions. However, its incredible complexity makes Byzantine notation much more difficult to learn. Furthermore the transcription of fast rhythmical compositions with a high density of notes is much lengthier and complicated in *Parasimantiki*, proving this system impractical for such occasions.

Epilogue

The theoretical systems examined here, which coexisted and developed side by side in the multicultural environment of Istanbul, seem to have played a dual role throughout their history. Firstly, there is the role of a natural science, which observes, studies and develops a language to describe music as a constantly changing natural phenomenon. Secondly, there is the role of an applied science which, having elucidated the laws of the phenomena under consideration, goes on to engage in the process of music evolution by continuously creating new structures, which provide endless feedback into musical practice. The contemporary manifestations of the modal and notational systems involved present a considerable number of similarities as well as differences in matters of methodology and conceptualization. Being in the process of evolution, these twin theoretical models stand to benefit greatly if theoreticians manage to exchange ideas in the way that musicians have always done, given that the consideration of different perspectives on the same subject has always promoted theorizing.

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[1] At this point it is worth mentioning that Yekta, after one year (1905) of studying the Byzantine system with Iakovos Nafpliotis, first chanter of the Patriarchate, attested that the two musical languages were the same (Yekta 1924: 40).

[2] According to Archytas “the ratio of any melodic interval should be of the *epimoric* form” (Barker 1989: 43). This statement can be justified by the fact that these intervals, being the ones formed by all the successive harmonics of a fundamental frequency and expressed by frequency ratios of the form $(n+1)/n$ (where n is an integer), are very easily perceived when hearing any sound rich in harmonics and for that reason are very familiar to the human ear. Familiarity to the human ear is probably the most reasonable criterion for these intervals to be regarded as euphonic. In most occasions the lower harmonics are far more distinguishable because they emerge louder than the higher ones. Ratios formed by small integers - even though not being *epimoric* - are also formed by lower harmonics of the harmonic series and therefore can also be characterized as euphonic.

[3] Information obtained by oral communications with leading Turkish musicians such as C. Tanrıkorur, M. Tokaç and U. Gürelman.

[4] It is worth mentioning that contemporary authors continue to introduce further suggestions for the improvement of the systems (Karas 1986; Konstantinou 2003; Tanrikorur [unpublished ûd method], Torun 1993).